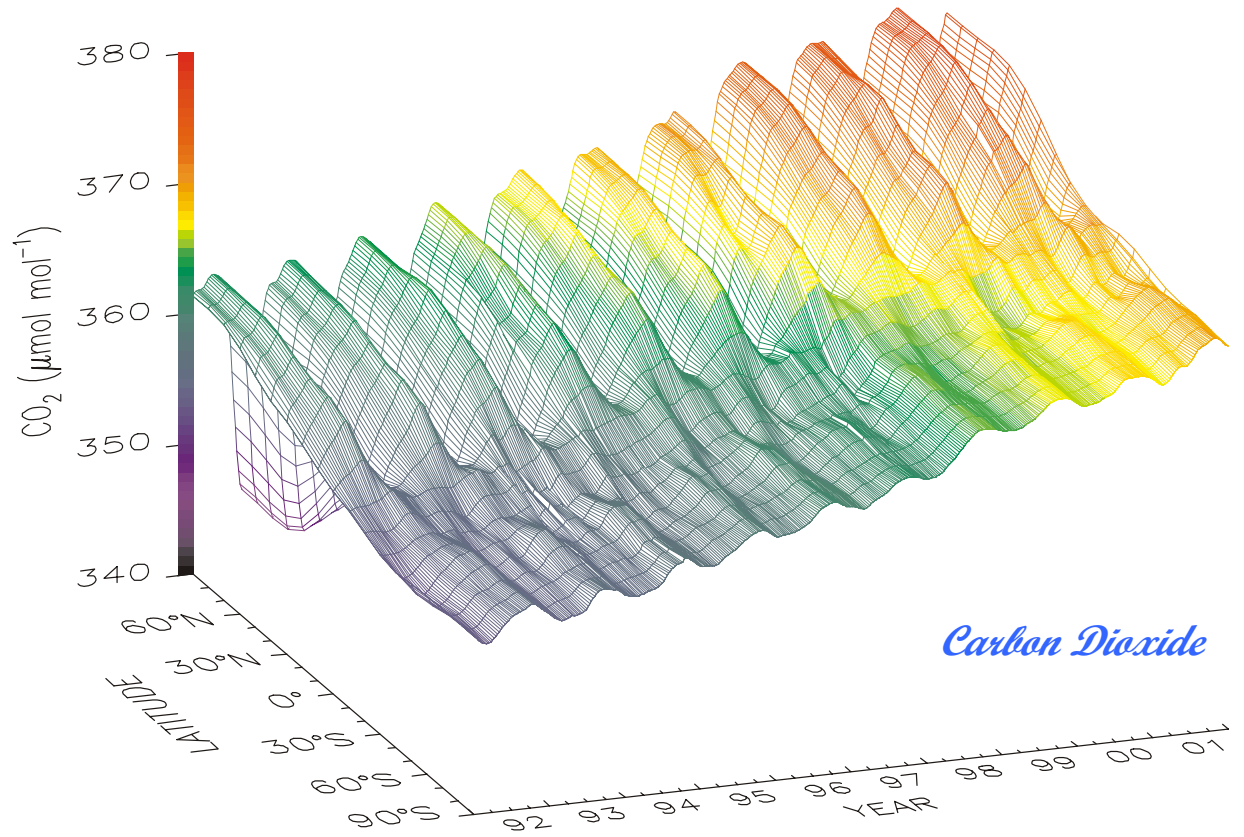
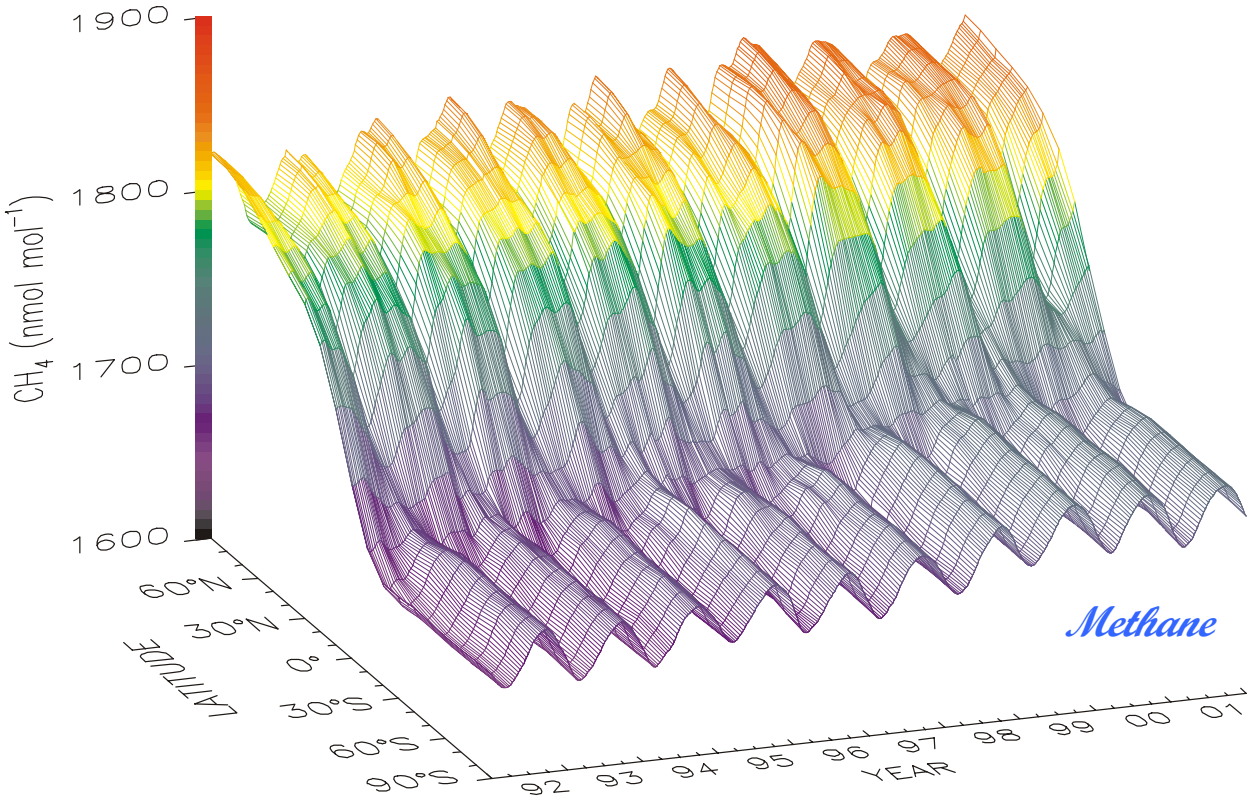

380
370
360
350
340
CO_2 (μmol mol^{-1})
60°N
30°N
0°
30°S
60°S
90°S
LATITUDE
92
93
94
95
96
97
98
99
00
01
YEAR
Carbon Dioxide


1900
1800
1700
1600
CH_4 (nmol mol^{-1})
60°N
30°N
0°
30°S
60°S
90°S
LATITUDE
92
93
94
95
96
97
98
99
00
01
YEAR
Methane

Back Cover: Three-dimensional representation of the latitudinal distribution of atmospheric carbon dioxide (top) and methane (bottom) in the marine boundary layer for the period 1990-2001 based on measurements from the NOAA CMDL cooperative air sampling network. Each surface represents data smoothed in time and latitude and highlights significant features of the atmospheric variation of each trace gas. **Carbon Dioxide:** The global abundance of CO_2 in the atmosphere is shown in moles CO_2 per 10^6 moles air (ppm). Annual mean CO_2 mixing ratios are 3-4 ppm higher in the northern hemisphere where anthropogenic emissions are greatest. Strong seasonality in the northern hemisphere is due to photosynthesis and respiration of the terrestrial biosphere. Seasonality in the southern hemisphere is much smaller and opposite in phase. Interannual variability in the seasonal cycle is due to variation in the balance between photosynthesis and respiration, and ocean uptake and release. **Methane:** The global abundance of atmospheric CH_4 is shown in moles CH_4 per 10^9 moles air (ppb). Unlike CO_2, the rate of increase has been slowing. CH_4 mixing ratios are ~150 ppb higher in the northern hemisphere where anthropogenic and natural sources of atmospheric methane are predominantly located. Seasonal patterns in the northern hemisphere are determined by the interaction of seasonally varying sources, sinks, and atmospheric transport. Seasonality in the southern hemisphere is opposite in phase and driven mostly by chemical destruction by OH radical. These smoothed surfaces are derived from thousands of CO_2 and CH_4 observations and provide powerful constraints on the global carbon cycle.